



ON Semiconductor®

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# CPH6153

## Bipolar Transistor -20V, -3A, Low VCE(sat), PNP Single CPH6

### Applications

- Load switch, DC-DC converter, motor drivers, charger

### Features

- Adoption of MBIT process
- Large current capacity
- Low collector-to-emitter saturation voltage
- High speed switching
- Ultrasmall-sized package permitting applied sets to be made small and slim (0.9mm)
- High allowable power dissipation
- IECO is guaranteed for preventing reverse flow from the collector to the emitter

### Specifications

#### Absolute Maximum Ratings at Ta=25°C

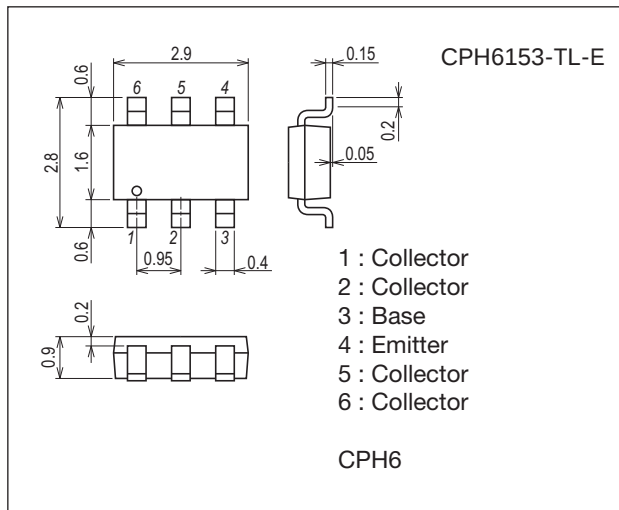
| Parameter                    | Symbol           | Conditions                                                    | Ratings     | Unit |
|------------------------------|------------------|---------------------------------------------------------------|-------------|------|
| Collector-to-Base Voltage    | V <sub>CB0</sub> |                                                               | -20         | V    |
| Collector-to-Emitter Voltage | V <sub>CEO</sub> |                                                               | -20         | V    |
| Emitter-to-Base Voltage      | V <sub>EB0</sub> |                                                               | -5          | V    |
| Collector Current            | I <sub>C</sub>   |                                                               | -3          | A    |
| Collector Current (Pulse)    | I <sub>CP</sub>  |                                                               | -5          | A    |
| Base Current                 | I <sub>B</sub>   |                                                               | -600        | mA   |
| Collector Dissipation        | P <sub>C</sub>   | When mounted on ceramic substrate (600mm <sup>2</sup> ×0.8mm) | 1.3         | W    |
| Junction Temperature         | T <sub>j</sub>   |                                                               | 150         | °C   |
| Storage Temperature          | T <sub>stg</sub> |                                                               | -55 to +150 | °C   |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

### Package Dimensions

unit : mm (typ)

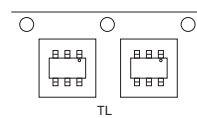
7018A-002



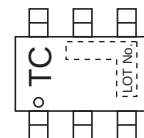
### Product & Package Information

- Package : CPH6
- JEITA, JEDEC : SC-74, SOT-26, SOT-457
- Minimum Packing Quantity : 3,000 pcs./reel

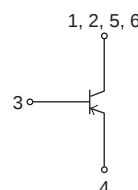
### Packing Type: TL



### Marking



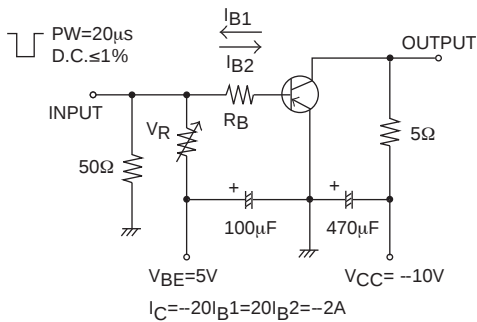
### Electrical Connection



Electrical Characteristics at  $T_a=25^\circ\text{C}$ 

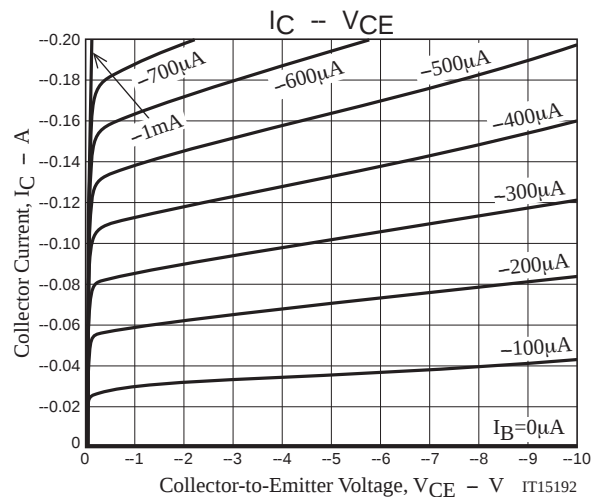
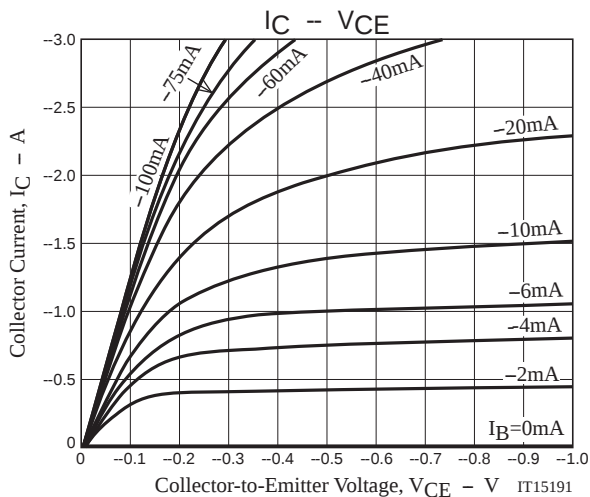
| Parameter                               | Symbol        | Conditions                                  | Ratings |       |      | Unit          |
|-----------------------------------------|---------------|---------------------------------------------|---------|-------|------|---------------|
|                                         |               |                                             | min     | typ   | max  |               |
| Collector Cutoff Current                | $I_{CBO}$     | $V_{CB} = -20\text{V}, I_E = 0\text{A}$     |         |       | -0.1 | $\mu\text{A}$ |
| Emitter Cutoff Current                  | $I_{EBO}$     | $V_{EB} = -4\text{V}, I_C = 0\text{A}$      |         |       | -0.1 | $\mu\text{A}$ |
| Emitter Cutoff Current                  | $I_{ECO}$     | $V_{EC} = -4.5\text{V}, I_B = 0\text{A}$    |         |       | -1   | $\mu\text{A}$ |
| DC Current Gain                         | $h_{FE}$      | $V_{CE} = -2\text{V}, I_C = -100\text{mA}$  | 200     |       | 560  |               |
| Gain-Bandwidth Product                  | $f_T$         | $V_{CE} = -10\text{V}, I_C = -300\text{mA}$ |         | 400   |      | MHz           |
| Output Capacitance                      | $C_{ob}$      | $V_{CB} = -10\text{V}, f = 1\text{MHz}$     |         | 22    |      | pF            |
| Collector-to-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C = -1.5\text{A}, I_B = -75\text{mA}$    |         | -130  | -195 | mV            |
| Base-to-Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C = -1.5\text{A}, I_B = -75\text{mA}$    |         | -0.93 | -1.2 | V             |
| Collector-to-Base Breakdown Voltage     | $V_{(BR)CBO}$ | $I_C = -10\mu\text{A}, I_E = 0\text{A}$     | -20     |       |      | V             |
| Collector-to-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C = -1\text{mA}, R_{BE} = \infty$        | -20     |       |      | V             |
| Emitter-to-Base Breakdown Voltage       | $V_{(BR)EBO}$ | $I_E = -10\mu\text{A}, I_C = 0\text{A}$     | -5      |       |      | V             |
| Turn-On Time                            | $t_{on}$      | See specified Test Circuit.                 |         | 35    |      | ns            |
| Storage Time                            | $t_{stg}$     | See specified Test Circuit.                 |         | 65    |      | ns            |
| Fall Time                               | $t_f$         | See specified Test Circuit.                 |         | 12    |      | ns            |

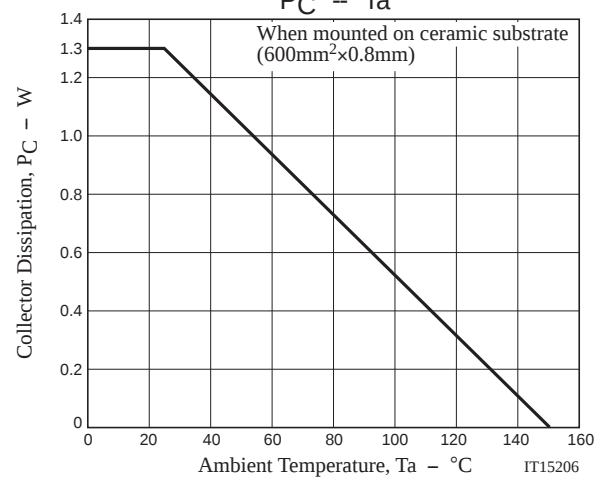
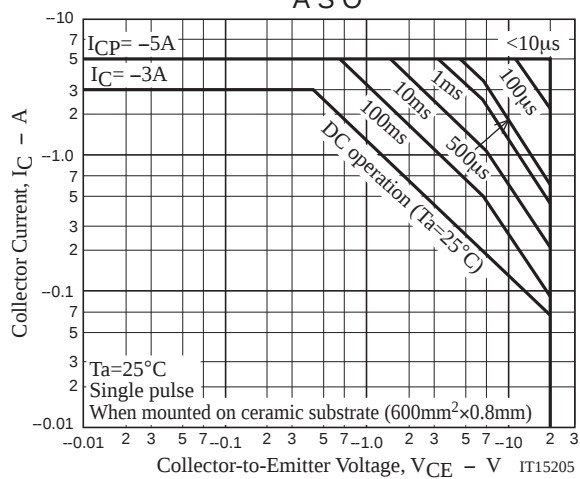
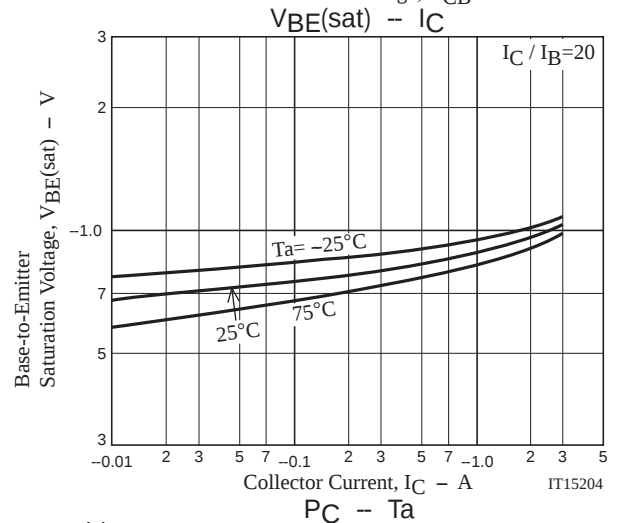
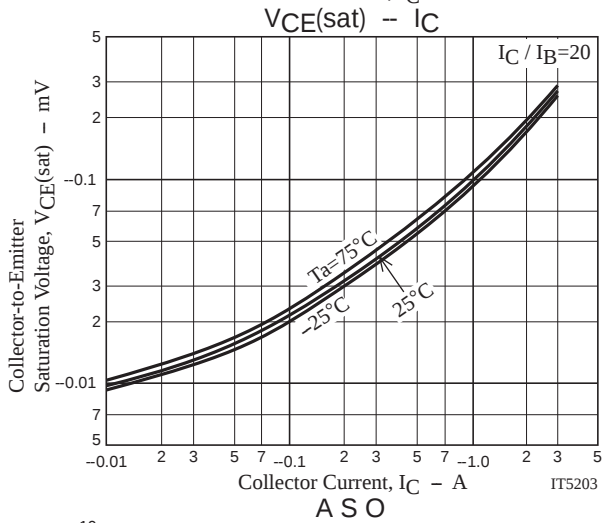
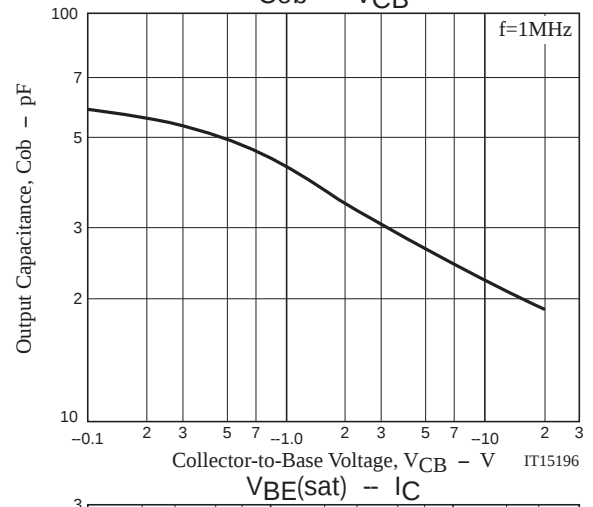
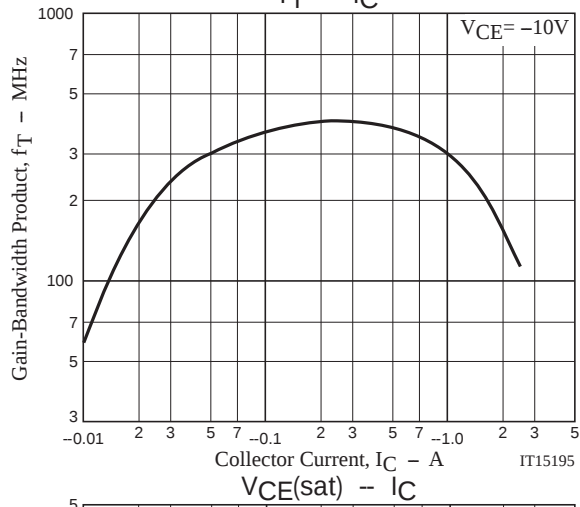
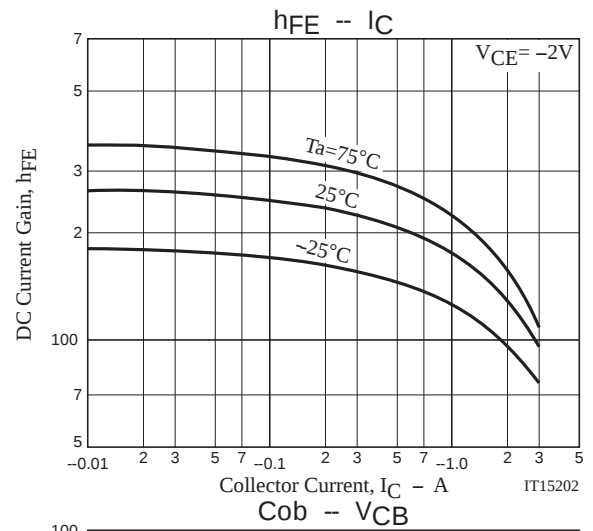
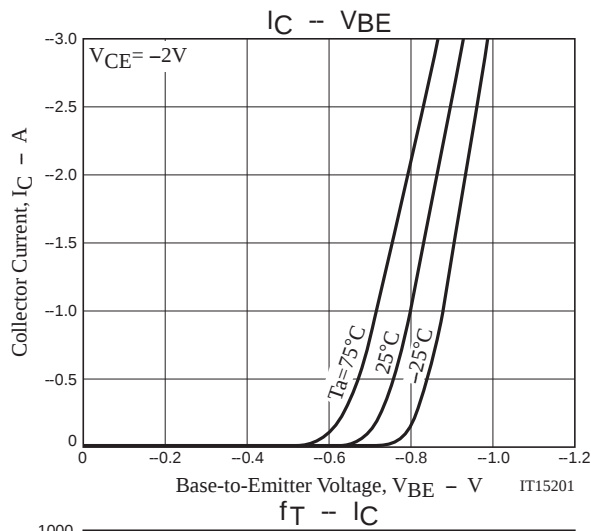
## Switching Time Test Circuit



## Ordering Information

| Device       | Package | Shipping       | memo    |
|--------------|---------|----------------|---------|
| CPH6153-TL-E | CPH6    | 3,000pcs./reel | Pb Free |





## Embossed Taping Specification

CPH6153-TL-E

## 1. Packing Format

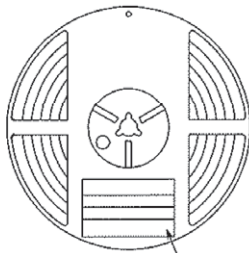
| Package Name | Carrier Tape Type | Maximum Number of devices contained (pcs) |           |           | Packing format                                              |                                                                    |
|--------------|-------------------|-------------------------------------------|-----------|-----------|-------------------------------------------------------------|--------------------------------------------------------------------|
|              |                   | Reel                                      | Inner box | Outer box | Inner BOX (C-1)                                             | Outer BOX (A-7)                                                    |
| CPH6         | CPH6              | 3,000                                     | 15,000    | 90,000    | 5 reels contained<br>Dimensions:mm (external)<br>183×72×185 | 6 inner boxes contained<br>Dimensions:mm (external)<br>440×195×210 |

Reel label, Inner box label  
(unit:mm)

Outer box label

It is a label at the time of factory shipments.  
The form of a label may change in physical  
distribution process.

## Packing method



Reel label

Type No.  
LOT No.  
Quantity  
Origin

|          |                       |
|----------|-----------------------|
| TYPE     | 000000000             |
| LOT      | 00                    |
| QTY      | 0,000 (1) LEAD FREE * |
| SPECIAL  | *20722005310C*        |
| ASSEMBLY | **** (DIFFUSION:****) |

NOTE (1)

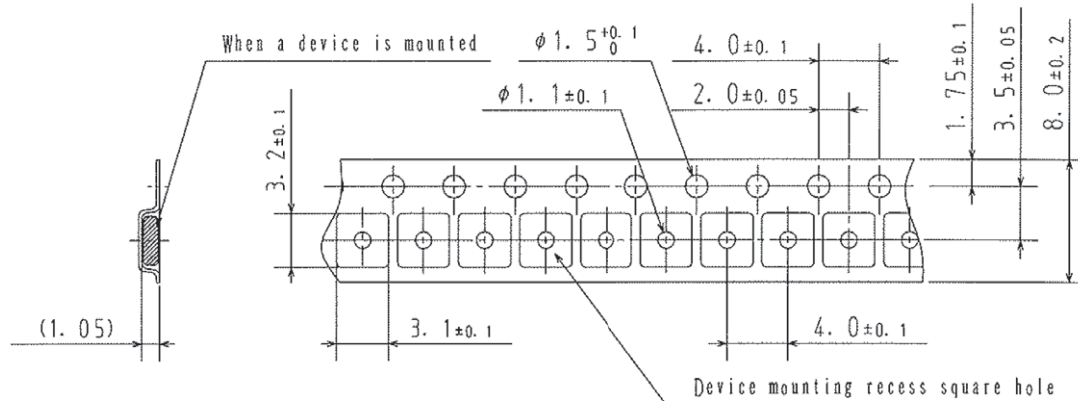
The LEAD FREE \* description shows that the surface  
treatment of the terminal is lead free.

| Label       | JEITA Phase    |
|-------------|----------------|
| LEAD FREE 3 | JEITA Phase 3A |
| LEAD FREE 4 | JEITA Phase 3  |

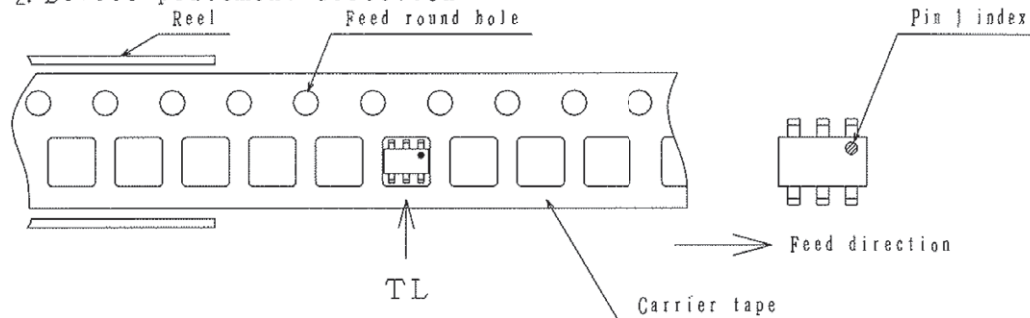
|           |                           |
|-----------|---------------------------|
| TYPE CODE | *****                     |
| TYPE      | *****                     |
| QTY       | 0,000 PCS (1) LEAD FREE * |
| LOT       | *****                     |
| PACKAGE   | *****                     |
| SPECIAL   | *20722005310C*            |
| ASSEMBLY  | **** (DIFFUSION:****)     |

## 2. Taping configuration

## 2-1. Carrier tape size (unit:mm)

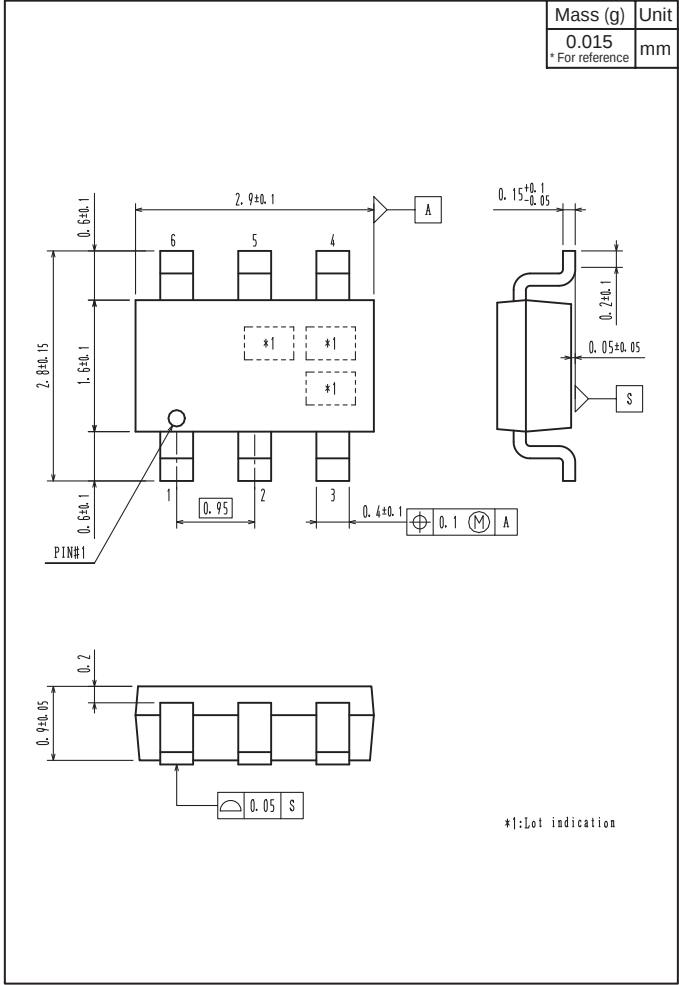


## 2-2. Device placement direction

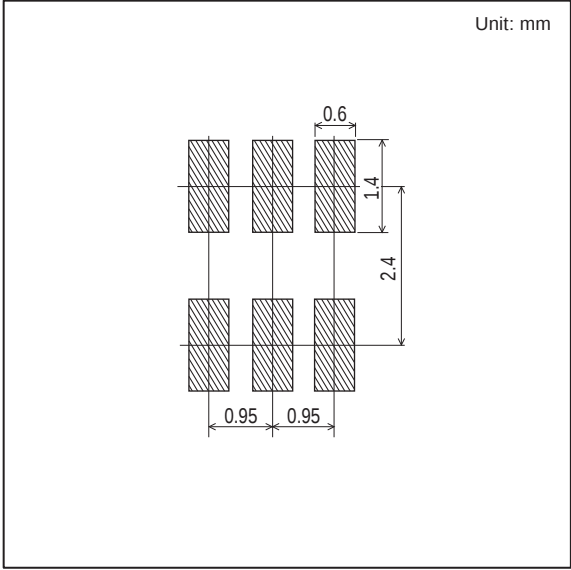


Those with pin 1 index on the feed hole side.....TL

Outline Drawing  
CPH6153-TL-E



Land Pattern Example



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